

Letters

RESEARCH LETTER

A Simple Technique for Droplet Control During Mastoid Surgery

For more than 100 years, mastoidectomy has been a common procedure in otolaryngology in the management of cholesteatoma and infections and cochlear implantation. Concerns about droplets and virus aerosolization have been raised during the coronavirus disease 2019 (COVID-19) crisis, particularly after an endoscopic hypophysectomy in Wuhan, China, supposedly led to 14 members of the surgical team becoming infected with the novel coronavirus.¹⁻³ The goal of this case-control study was to devise a drape system to control the droplet spray during mastoidectomy.

Methods | The procedure was carried out on a cadaveric temporal bone in an operating room with a surgeon and a surgical technician. The Zeiss Extaro 300 microscope (Carl Zeiss Meditec AG) was covered with a Zeiss-brand microscope drape. Two different clear drapes were then attached to the lens cap apparatus:

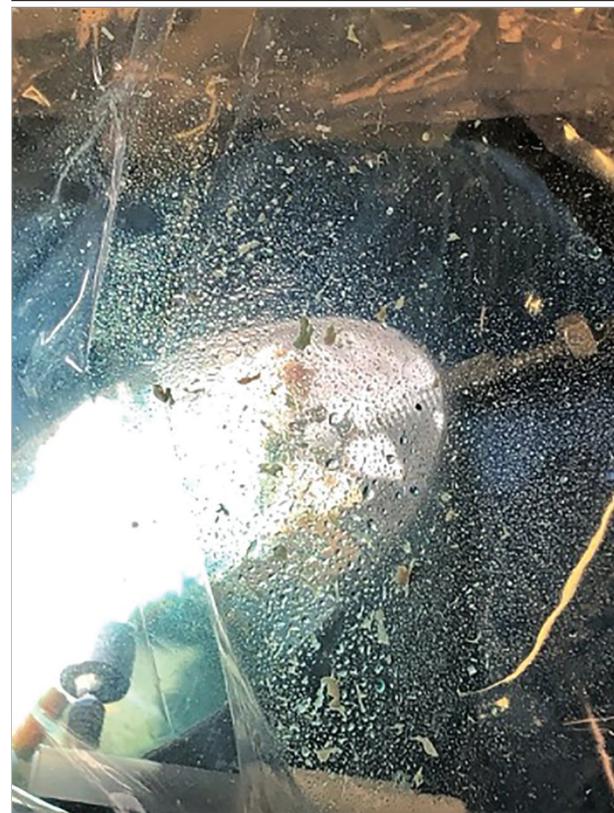
the Steri-Drape 1015 (3M) and the C-Armor (Tidi). The Steri-Drape 1015 was attached to the microscope drape using the adhesive along the split and then zipped to itself, with the surgeon putting her arms under the drape. The much larger C-Armor drape was attached by making a 4- to 5-cm incision in the drape and then stretching it tightly around the lens cap cover apparatus of the microscope drape. Because of the large size of the drape, both forearms were inserted through 2 small cuts in the drape to keep a tight fit. Both drapes were then stretched over a Mayo stand at the patient's head. The clear drape was attached to the surgical drape over the patient chest area using Ioban (3M) to limit aerosol spread toward the anesthetist. Mastoidectomy was then performed in the usual fashion under both drapes, with added methylene blue after the preferred drape was determined to look for gross droplet soiling as well as in a suction scavenger placed near the mastoid. The study was exempt from institutional review board review because it involved single use of deidentified cadaveric tissue.

Results | Surgical visualization was unimpeded with both drapes, and the collection of bone dust and droplets did not cause undue sagging of the drapes. While the split-drape adhesive design of the 1015 drape was easier to attach to the

Figure 1. Surgical Setup With Clear Plastic Drape (C-Armor) in Place



Figure 2. Spray on Drape After 5 Minutes of Drilling



microscope, the C-Arm's larger size gave much better coverage and overlap with the surgical drape (Figure 1). Furthermore, visualization of the instruments for the technician was easier with the C-Arm rather than the matte finish of the Steri-Drape 1015. Although the surgical procedure was accomplished without the drape getting in the way, extensive irrigation and large bone dust and irrigation droplets were collected on the drape and inside the scavenger suction within minutes (Figure 2).

Discussion | The middle ear cleft is directly connected to the nasopharynx via the eustachian tube and therefore could be considered a possible route of spread for coronavirus or other infections. Furthermore, drilling of the mastoid creates a large cloud of irrigation and bone dust that can easily come in contact with facial skin or be inhaled. While the technique described here is far from airtight, it controls large droplet spray very well using readily available surgical drapes. Other large, clear drapes will probably adapt even better than the 2 tried in this study.

Mastoidectomy is usually an elective procedure and is typically deferred until severe infection is controlled. While rapid COVID-19 screening should ultimately diminish the risk of infecting surgical staff, false negatives will occur, especially in asymptomatic early infections. The risk to the surgeon and staff should be evaluated according to risk stratification protocols, and proper N95 masks and personal protective equipment should be used when indicated. However, it has been our observation that using a microscope with a face shield is virtually impossible, and the method described herein avoids the need for face shields to allow for otherwise normal drilling conditions.

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